REMARKS

The Office Action mailed May 23, 2003 has been carefully considered. Reconsideration of this application, as amended and in view of the following remarks, is respectfully requested.

Amendments to the Specification

Paragraphs at pages 1 – 2, 9, 11, 13 and 22 have been amended to correct minor grammatical informalities (e.g., a misplaced "is", sentence fragments, etc.). The paragraph on page 22 has been corrected to include a missing figure number. None of these amendments add new matter.

The Claims

Claims 1 – 9, including independent claims 1, 4 and 7, are pending in this application prior to entry of this Amendment. No claims have been canceled. Claims 10 – 13, including independent claim 13, have been added. After entry of this amendment, claims 1 – 13 are pending in this application, including independent claims 1, 4, 7 and 13.

Claims 1 – 9 have been amended to correct minor informalities. Claims 1, 2 and 4 have been amended so that each claim uses the language "analog fluctuations." Claims 1 and 4 as originally filed used the term "analog variations" while independent claim 7 and dependent claims 2, 3, 5, 6, 8 and 9 used the term "analog fluctuations." The specification shows that the intended and appropriate terminology is "analog fluctuations"; see claim 7 as originally filed and currently amended, the specification, e.g., at pg. 5, lines 24 – 28, and at pg. 7, lines 13 – 15. Claims 5 and 8 were corrected to add missing periods at the end; claims 4 and 7 were corrected to add missing colons after the word "comprising". Claims 2, 3, 5, 6, 8 and 9 have been amended for better form (i.e., now referring to the electrical characteristics.)

Claims 1, 4 and 7 have been amended to better define the term "marketwire," Support for this amendment is found in the specification specifically

at page 18, lines 2 – 3 and elsewhere, for example, at pp. 5, 12 and 13 – 14 and in Figure 3. Claim 1 has also been amended to remove the sensor element to new dependent claim 10.

Claims 10 – 13 have been added. Claim 10 includes a limitation that was formerly in claim 1. Support for claim 11 may be found in the specification at, for example, pages 24 – 29. Support for claim 12 may be found in Figure 17 and in the accompanying discussion at pp. 23 – 24 of the specification. Support for claim 13 may be found, *inter alia*, at pg. 5 of the specification.

Information Disclosure Statements

Accompanying this amendment is an Information Disclosure Statement (IDS) that includes a copy of US 6,568,592 (hereafter the '592 patent) issued May 27, 2003 to Jackson et al. The invention disclosed and claimed in the '592 patent, which was commonly owned by the assignee of the subject application at the time the subject application was filed, includes related subject matter. Also included in the IDS is a copy of the patent documents cited by the Examiner in the '592 case. Also included in the IDS is a copy of US 6,560,493 B1 to Dahleh et al, which is discussed briefly below.

Preliminary Remarks about Applicants' Invention

Applicants understand that it is necessary to amend and add limitations to claims where examination shows that the subject claims are anticipated by or are rendered obvious in view of relevant prior art references. Applicants are at a loss, however, as to how to amend the claims in the instant case to avoid the cited reference when the cited reference teaches subject matter that is so distinctly different from the claimed invention and does not teach even the most basic of the recited claim limitations.

As noted in MPEP 2111, during patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification," citing *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667

(Fed. Cir. 2000). Applicants are aware that broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). However, as also noted in MPEP 2111, the broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach, citing *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342, 60 USPQ2d 1851, 1854 (Fed. Cir. 2001) and *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999). As further noted in MPEP 2111.01, the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). The MPEP cites *Toro Co. v. White Consol. Indus., Inc.*, 199 F.3d 1295, 1299, 53 USPQ2d 1065, 1067 (Fed. Cir. 1999) for commenting that "words in patent claims are given their ordinary meaning in the usage of the field of the invention, unless the text of the patent makes clear that a word was used with a special meaning."

In view of the fact that this is the third Office Action in which the Examiner has maintained the same rejection, Applicants wish to provide the Examiner with some information that will direct the Examiner to a more appropriate search category.

The field of invention

The field of invention, as stated in the application, "relates to analog circuits implementing market allocation for control and coordination of actuators inducing structural movement." Systems that control and coordinate the operation of actuators are well-known. See, for example, recently issued US 6,560,493 B1 to Dahleh et al. on May 6, 2003 entitled "Architecture for Distributed Control of Actuator and Sensor Arrays," where the background briefly provides some information about the state of the art, at the time of its filing, of the control and coordination of a large array of actuators, such as the microscopic actuators found in the field of MEMS:

> In various control engineering applications, it is desired to regulate some physical variable throughout the length, area, or volume of a medium. Examples can include elimination of vibration in flexible, solid material structures, disturbance elimination in fluid flow, uniform temperature regulation throughout a fluid pool, etc. Until recently, the typical interface between the medium and the controller consisted of a relatively small number of sensors and actuators at fixed locations. The sensors continuously monitor the actual state of the relevant physical variables at their respective locations while the actuators continuously act in real time on the medium in response to controller logic. The controller, which typically comprises a microprocessor, determines the appropriate action on the basis of the sensor readings, predetermined control objectives, and the control algorithm logic.
>
> Recent advancements in micro-electro-mechanical systems (MEMS) have produced microscopic devices with actuating, sensing, computing, and/or telecommunication capabilities. It is preferred to distribute a large array of MEMS in a spatial configuration in order to enhance capabilities for control. Examples can include distributed flow control for drag reduction, "smart" mechanical structures such as a building able to automatically respond to earthquakes, and cross-directional control of large scale paper machines.

US 6,560,493 B1, col. 1, lines 13 – 44.

On the other hand, market-based allocation for the control and coordination of actuators appears to be a relatively new research field. Applicants have provided an article, attached hereto as Exhibit 1, published in 2002 which provides background in addition to that presented in the specification. The article citation is: Lynch, Jerome P. and Law, Kincho H., Energy Market-Based Control of Linear Civil Structures, in *Proceedings of the US-Korea Workshop on Smart Structural Systems,* Pusan, Korea, August 23-24, 2002 (hereafter, Lynch, 2002). As can be seen from the article, the energy market control-based control system described therein is applied to a building to control movement during seismic or wind-driven events. Lynch 2002 describes the suitability of a market-based approach as follows:

> Most recently, the explosion in development of MEMS sensing and actuation systems has resulted in many large-scale control problems. With the reliability of MEMS sensors and actuators

> lower than conventional counterparts, adaptive and flexible control methods are required with decentralized control solutions most popular. Researchers have explored using free-market concepts as one approach for controlling large-scale MEMS systems (Guenther et al. 1997). By modeling the control system as a free-market economy, where actuators are market buyers and power source are market sellers, an *a priori* decentralized control solution can result. Market-based control (MBC) methods have also been applied for controlling the computational load of microprocessors and for load-balancing in data networks (Clearwater 1996).

Lynch 2002, at pg. 3 of Exhibit 1, lines 1 – 9, citing an article by two of the named inventors herein.

The term "actuator"

Several types of actuators are referred to in the specification to illustrate various embodiments of market-based control systems. In the context of the claims of the subject application, however, the term "actuator" has an ordinary meaning in the field of engineering. An actuator is "an electromechanical device that physically moves an object." See the National Instruments web site at http://zone.ni.com/devzone/nidzglos.nsf. An actuator is also defined as "[a] device used to transfer motion from one object to another. An actuator activates a movement or a process." See the Process Index website at http://www.processindex.com/glossary.htm.

In these definitions, the term "actuator" encompasses a physical device that physically moves an object or element (or structure.) Moreover, other language in the subject claims supports this interpretation of the term "actuator." See, for example, Claim 4, where each of the multiple actuators has an actuator controller that is responsive to price information to control applied force of the actuator to collectively promote movement of a structure from a first position to a second position.

More relevant art in the field of invention may be found in Class 700

Applicants note that the preliminary class assigned to the subject application is Class 705. The Abelow reference that forms the basis of the §102 rejection is also classified in Class 705. In describing the scope of Class 705, the Manual of Patent Classification (MPC) states that "[t]he arrangements in this class are generally used for problems relating to administration of an organization, commodities or financial transactions." The terminology of producers, consumers, price and cost that is used to describe the subject invention is borrowed from the field of economics and has been applied to the field of control engineering.

US 6,560,493 B1 to Dahleh et al. (hereafter Dahleh) illustrates an example of an alternative search domain. Dahleh is classified in Class 700 Sub-class 28 which is described as being "the generic class for the combination of a data processing or calculating computer apparatus (or corresponding methods for performing data processing or calculating operations) AND a device or apparatus controlled thereby, the entirety hereinafter referred to as a 'control system'." Sub-class 28 is described as including "[s]ubject matter where a control seeks to optimize a system performance criterion (e.g., efficiency, consumption, or profit)."

Claim 1 of the subject application begins with the words "[a] distributed market based control assembly for a structure comprising". It is respectfully suggested that the language of claim 1 is more closely related to the definitions and scope given for Class 700 than for those of Class 705. Thus, it is respectfully submitted that, in view of the preceding remarks describing the intended field of invention, it is more likely that art relevant to the subject invention would be found in Class 700.

Limitations to broadly defined claim elements are only required when a *prima facie* case of anticipation or obviousness has been made by reference to relevant prior art.

Given that the research field of market-based allocation for the control and coordination of actuators/producers may be a relatively new one, it is conceivable that Applicants may be among the first in the field of market-based control engineering to file a patent application on a distributed market based control assembly for a structure. If that were true, Applicants would be entitled to the relatively broad scope of claim language now in the pending claims, without the need to limit, for example, the term "structure" to a "robotic arm," or the term "actuator" to a particular type of actuator that applies a force.

Request for New Search

In view of the preceding remarks, Applicants respectfully ask that a new search be performed so that a more relevant prior art reference may be applied against the subject claims. Applicants have filed an RCE to provide the Examiner with this clarifying information regarding the field and scope of the subject invention, and to make of record the references cited in the related application. If the Examiner persists in citing the Abelow reference, Applicants may seek an appeal of the rejection of the claims for review of the appropriateness of the interpretation given to the claim language.

35 USC § 102 Rejection

In the Office Action, Claims 1 - 9 were rejected, in paragraph 4, under 35 U.S.C. § 102 as being anticipated by Abelow (US 4,679,154). Anticipation under 35 U.S.C. § 102 requires that each and every claim limitation be disclosed by the applied reference. With reference first to independent claims 1, 4 and 7, Abelow does not teach each and every claim limitation of claims 1, 4 and 7 and therefore, as a matter of law, cannot anticipate these claims.

With respect to claim 1, Table 1 puts the claim elements of claim 1 next to the teaching(s) of Abelow recited in the Office Action for that element:

Table 1

Claim 1	Abelow
A distributed market based control assembly for a structure	A product or service that contains a microprocessor and a facility for communication (OA, para. 4)
multiple actuators, each of the multiple actuators having an actuator controller that is responsive to price information to control an applied force by the actuator on the structure;	a combination of computer hardware, software and communications technologies to construct a module that is built into certain products and services to establish a network. Abelow, col. 2, lines 13 – 27.
an electrical conductor for transmitting voltage and accumulating charge, referred to as a marketwire; the marketwire being connected to each actuator controller to convey the price information to the actuator controllers by analog fluctuations in an electrical characteristic of the marketwire.	Specialized feedback systems from customers and markets that enable them to talk back to products so that audiences may accomplish their objectives better than is currently possible. Abelow, col. 76, lines 61 – 65.

The Office Action appears to characterize the microprocessor and the facility for communication as the "structure," and explicitly states that the multiple actuators are the computer hardware, software and communications technologies. Assuming for the purpose of argument that this is a valid interpretation, the multiple actuators element in claim 1 has a further limitation that each actuator has an actuator controller that is responsive to price information to control an applied force by the actuator on the structure. The cited passage in Abelow

makes no mention of price information, nor how price information is represented in Abelow. Assume for the purposes of argument only that the feedback system recited as teaching the electrical conductor element In claim 1 does teach that limitation. That would require that Abelow teach that customers talk back to products about product pricing information; no such teaching has been provided, In contrast, the electrical conductor element of claim 1 recites that the marketwire conveys the price information to the actuator controllers by analog fluctuations in an electrical characteristic of the marketwire.

Moreover, the cited passage also does not disclose an actuator controller that controls an applied force by the actuator on the structure. In order to teach this limitation of claim 1, the actuator (the computer hardware, software or communication technology in the recited teaching of Abelow) must control an applied force on the microprocessor and facility for communication (interpreted to be the structure). In addition to not teaching the controller being responsive to price information, the cited passage does not teach the control of an applied force by any one of the computer hardware, software or communications technology on the structure. One might assume that each of the computer hardware and communications technologies may include a controller (e.g., processor) but it is impermissible to assume that Abelow teaches, rather than recite the disclosure that teaches, that the assumed controllers control an applied force on the microprocessor and facility for communication that has been recited as the structure.

It is also respectfully submitted that the cited passage that purportedly teaches the electrical conductor, or marketwire, is devoid of any reference to such an electrical conductor. The Office Action seems to conclude that the term "feedback system" is sufficient by itself, without reference to the other explicit limitations in Claim 1, to teach the electrical conductor being connected to each actuator controller to convey the price information to the actuator controllers by analog fluctuations in an electrical characteristic of the marketwire. The claim

language explicitly states that price information is conveyed to the actuator controllers "by analog fluctuations in an electrical characteristic of the marketwire." The recitation of the feedback systems from customers and markets introduce another agent into the claim, that of the customers, that allow them to talk back to products. Customers in Abelow are real people (see, e.g., col. 3, lines 22 – 26, col. 11, lines 15 – 20.) None of the elements in claim 1 is a real person, so even if the electrical conductor connected to each actuator controller to convey price information could be interpreted to be a "feedback system," the feedback system disclosed in the recited passage in Abelow is directed to people talking to products, not an electrical conductor conveying price information by analog fluctuations in an electrical characteristic of the marketwire to actuator controllers, as required by claim 1.

Putting together the three recitations of the Office Action produces the following teaching from Abelow: A product or service that contains a microprocessor and a facility for communication comprising a combination of computer hardware, software and communications technologies to construct a module that is built into certain products and services to establish a network and specialized feedback systems from customers and markets that enable them to talk back to products so that audiences may accomplish their objectives better than is currently possible. It is respectfully submitted that this disclosure does not teach at least three of the claim limitations of claim 1, as described above: conveying price information to the actuator controllers by analog fluctuations in an electrical characteristic of the market wire; actuator controllers that control the applied force by the actuators on the structure, and an electrical conductor connected to the each actuator controller for conveying the price information. Therefore, the Office Action does not make a *prima facie* case of anticipation under §102 with respect to claim 1.

Table 2

Claim 4	Abelow
A distributed market based control assembly for a mobile structure	A product or service that contains a microprocessor and a facility for communication (OA, para. 4)
multiple actuators, each of the multiple actuators having an actuator controller that is responsive to price information to control an applied force by the actuator to collectively promote movement of a structure from a first position to a second position;	a combination of computer hardware, software and communications technologies to construct a module that is built into certain products and services to establish a network. Abelow, col. 2, lines 13 – 27.
a sensor for measuring the movement of the structure from the first position to a the second position,	Productivity measures. Abelow, col. 1, lines 56 – 67, col. 2, lines 1 – 5.
an electrical conductor for transmitting voltage and accumulating charge, referred to as a marketwire; the marketwire being connected to each actuator controller to convey the price information to the actuator controllers by analog fluctuations in an electrical characteristic of the marketwire.	Specialized feedback systems from customers and markets that enable them to talk back to products so that audiences may accomplish their objectives better than is currently possible. Abelow, col. 76, lines 61 – 65.

The multiple actuator limitation of claim 4 includes the limitation that the actuator controllers collectively promote movement of a structure from a first position to a second position. The recited teaching of Abelow does not disclose the actuator controllers (the controllers of the hardware, software and communications technology) collectively promoting movement of a structure

(microprocessor and communications facility). Abelow does not seem to discuss any of the structure elements moving from a first position to a second position under the control of the actuator controllers. People moving the hardware around doesn't count.

The recited passage that purportedly teaches a sensor for measuring the movement of the structure from the first position to the second position includes one sentence that reads as follows: "For example, the entire computing industry has been judged harshly for failing to significantly improve productivity measures." A few lines later there is a reference to requiring "systematic measurement". Neither of these passages recites the required structure of claim 4 of a sensor for measuring the movement of the structure (the microprocessor and communication facility), probably because in the disclosure of Abelow that purported structure doesn't move as a result of an applied force by the actuators to collectively promote movement. Therefore, the Office Action does not make a *prima facie* case of anticipation under §102 with respect to claim 4.

Claim 7 includes claim limitations similar to those of claim 4 but with at least one important difference: the multiple actuators element requires "multiple actuators, each of the multiple actuators having an actuator controller that is responsive to price information to control applied force by the actuator to collectively counter movement of a structure from a first position to a second position,"

The Office Action provides no recitation in Abelow for teaching the limitation of multiple actuators, each of the multiple actuators having an actuator controller that is responsive to price information to control applied force by the actuator to collectively counter movement of a structure from a first position to a second position," Therefore, the Office Action does not make a *prima facie* case of anticipation under §102 with respect to claim 7.

It has been demonstrated above that the arguments presented in the Office Action to support the teachings of claim 1, 4 and 7 are deficient with respect to

several explicit limitations included in those claims. While the Examiner may interpret the claims broadly for purposes of examination, that broad interpretation may not read out express limitations in applicants' claims.

For the foregoing reasons, is believed that independent claims 1, 4 and 7 are not anticipated by the Abelow disclosure, and they are believed to be in condition for allowance. Insofar as claims 2 – 3, 5 – 6, and 8 – 12, , are concerned, these claims all include the limitations of, and depend from their respective independent and now presumably allowable claims 1, 4 and 7. .

Reconsideration Requested

The undersigned respectfully submits that, in view of the foregoing amendments and remarks, the rejections of the claims raised in the Office Action dated May 23, 2003 have been fully addressed and overcome, and the present application is believed to be in condition for allowance. It is respectfully requested that this application be reconsidered, that these claims be allowed, and that this case be passed to issue.

If the Examiner believes that the claims are not in condition for allowance, the undersigned earnestly requests that the Examiner perform a new search and provide art that is more relevant to the patentability of the claims.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is hereby authorized to call Applicant's attorney, Nola Mae McBain, at Telephone Number (650) 812-4264, Palo Alto, California.

Respectfully submitted,

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